



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/811,088	03/25/2004	Gregory L. Plett	LGC-0004 (0009587-0006)	9743
23413	7590	03/15/2007	EXAMINER	
CANTOR COLBURN, LLP 55 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002			BOATENG, ALEXIS ASIEDUA	
			ART UNIT	PAPER NUMBER
			2838	
SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE		
3 MONTHS	03/15/2007	PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)
	10/811,088	PLETT, GREGORY L.
	Examiner	Art Unit
	Alexis Boateng	2838

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 10 January 2007.

2a) This action is **FINAL**. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1,6,9-13,16,17,21,24,29 and 75 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) Claim(s) _____ is/are allowed.

6) Claim(s) 1,6,9,11 - 13,16,17,24,29 and 75 is/are rejected.

7) Claim(s) 10,17 and 21 is/are objected to.

8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) All b) Some * c) None of:
1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. _____.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) Notice of References Cited (PTO-892) 4) Interview Summary (PTO-413)
2) Notice of Draftsperson's Patent Drawing Review (PTO-948) Paper No(s)/Mail Date. ____ .
3) Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date ____ . 5) Notice of Informal Patent Application
6) Other: ____ .

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1 – 3, 6, 9, 12 – 13, 29 and 75 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jae-Seung (U.S. 2004/0000892) in view of Usuda (U.S. 5,658,682).

Regarding claims 1 and 75, Jae-Seung discloses wherein a method for estimating the maximum discharge power of a battery comprising:

generating a signal indicative of a present state-of-charge of said battery, utilizing a sensor (paragraph [0026]); calculating said present state of charge of said battery based on said signal, utilizing an arithmetic circuit operable coupled to said sensor (figures 3 and 6 paragraphs [0033], [0038] – [0042]);

calculating a maximum discharge current of said battery utilizing said arithmetic circuit based on at least minimum state-of-charge limit associated with said battery, said present state-of-charge of said battery and a minimum voltage limit associated with said battery such that a future output voltage of said battery does not fall below said minimum voltage limit and a future state of charge of said battery does not fall below said minimum state-of-charge limit associated

with said battery (figure 3 items 150 discloses wherein a maximum current is calculated from the voltage; paragraphs [0033], [0038] – [0042]: maximum discharge current from no load voltage, which can be at any charge such as full charge which correspond to maximum voltage). Jae-Seung discloses the invention as previously claimed, but not the remainder. Usuda discloses in figure 2 wherein s4 is calculating said maximum discharge power based on said maximum discharge current value. At the time of invention, it would have been obvious to a person of ordinary skill in the art to modify the Jae-Seung system with the Usuda system so that a steady state of charge can be determined.

Regarding claim 2, Jae-Seung discloses in paragraph [0011] calculating a maximum discharge current of said battery based on current limits of said battery.

Regarding claim 3, Jae-Seung does not disclose the invention as claim. Usuda discloses in column 3 lines 8 – 17 wherein the discharge power takes into account of a horizon of delta t. At the time of invention, it would have been obvious to a person of ordinary skill in the art to modify the Koo system with the Usuda system so that the current may be continuously detected.

Regarding claim 6 and 12, Jae-Seung discloses wherein said battery is a battery pack comprising at least one cell (figure 5 shows wherein there is a battery with at least one cell).

Regarding claims 9 and 13, Jae-Seung discloses wherein calculating maximum discharge current of said battery is also based on a cell model. Jae-Sueng

further discloses in wherein said cell model is $V_k(t + \Delta t) = OCV(z_k(t + \Delta t)) - R_{xk}(t)$ (paragraph [0038]).

Regarding claim 29, Jae-Seung does not disclose the invention as claimed.

Usuda discloses in column 1 lines 39 – 50 wherein the maximum discharged power is checked to ensure it falls within power limits of said battery. At the time of invention, it would have been obvious to a person of ordinary skill in the art to modify the Jae-Seung system with the Usuda system so that the battery isn't over-discharged.

3. Claims 4, 11 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jae-Seung (U.S. 2004/0000892) in view of Usuda (U.S. 5,658,682) as applied to claim 1 and in further view of Plett (U.S. 6,534,954).

Regarding claim 4, neither Jae-Seung nor Usuda disclose the invention as claimed. Plett discloses in column 9 lines 28 – 39 wherein the state of charge are determined by using a Kalman filtering method. At the time of invention, it would have been obvious to a person of ordinary skill in the art to modify the Jae-Seung and Usuda system so that the internal states of the battery's system may be determined by using output values.

Regarding claims 11 and 16, neither Jae-Seung nor Usuda disclose the invention as claimed. Plett discloses in column 8 line 10 – 25 wherein said cell model is solved by using a discrete time-space model to calculate the SOC. At the time of invention, it would have been obvious to a person of ordinary skill in

the art to modify the Jae-Seung and Usuda so that the current can be calculated easier and provide a more accurate reading.

4. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jae-Seung (U.S. 2004/0000892) in view of Usuda (U.S. 5,658,682) as applied to claim 1 and in further view of Kawakami (U.S. 6,563,318).

Regarding claim 27, neither Jae-Seung nor Usuda disclose the invention as claimed. Kawakami discloses in column 21 lines 45 – 51 wherein the voltage may be calculated to the limits of infinity. At the time of invention, it would have been obvious to a person of ordinary skill in the art to modify the Jae-Seung and Usuda system with the Kawami system so that all values are taken into consideration to maintain proper discharge.

Allowable Subject Matter

5. Claims 10, 17, and 21 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. **Regarding claim 10**, the prior art does not disclose the combination of, *inter alia*, generating a signal indicative of a present state-of-charge of said battery utilizing a sensor; calculating said present state-of-charge limit said battery and wherein said cell model is solved by a Taylor expansion series. **Regarding claim 17**, the prior art does not disclose the combination wherein, *inter alia*, said discrete time-state model is $X_k[m+1] = f(X_k[m], u_k[m])$, $V_k[m] = g(X_k[m], u_k[m])$; wherein $f(*)$ and $g(*)$ are functions to model cell dynamics.

Regarding claim 21, the prior art does not disclose the combination of wherein $I_{(dis,volt)}(max_k)$ is found by looking for i_k that causes equality in $V_k [m] = g(X_k[m+T], u_k[m+T])$ wherein $g(*)$ and $u(*)$ is utilized to determine the cell voltage for the cell k at a predetermined time in the future.

Response to Arguments

6. Applicant's arguments filed 1/10/07 have been fully considered but they are not persuasive. **Regarding claims 1, 4, 5, 11 and 16**, the applicant argues wherein the Jae-Sung, Usuda, and Plett reference do not provide any teaching of "calculating a maximum discharge current of said battery...based on at least a minimum state-of-charge limit associated with said battery." Jae-Sung discloses in paragraphs [0038] – [0042] wherein a maximum discharge current is calculated from no load voltage. Jae-Sung further discloses in paragraph [0040] – [0042] wherein the voltage is maintained at a predetermined minimum. Usuda discloses in the column 5 lines 44 - 56 wherein the maximum discharge current is based on at least minimum state of charge limit. Usuda further disclose in column 3 lines 8 – 24 wherein the voltage is maintained above a terminal voltage, or a minimum voltage. Plett discloses in the abstract wherein the state of charge of the battery is used to carry out various functions. Plett further discloses in column 8 lines 26 – 44 wherein the terminal voltage is maintained at a certain level.

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alexis Boateng whose telephone number is (571) 272-5979. The examiner can normally be reached on 8:30 am - 6:00 pm, Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Karl Easthom can be reached on (571) 272-1989. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AB



KARL EASTHOM
SUPERVISORY PATENT EXAMINER